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A Plan to Reestablish a Natural Population of Atlantic Salmon in the Point Wolfe River, Fundy National Park

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August, 1982

A PLAN TO REESTABLISH A NATURAL POPULATION OF ATLANTIC SALMON IN THE POINT WOLFE RIVER, FUNDY NATIONAL PARK

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ABSTRACT

Alexander, D.R. and P. Galbraith. 1982. A plan to reestablish a natural population of Atlantic salmon in the Pointe Wolfe River, Fundy National Park. Can. MS Rep. Fish. Aquat. Sci. No. 1667. v + 8 p.

A decision to provide upstream fish passage at the Point Wolfe River Dam prompted an updated review of the potential for reestablishment of an Atlantic salmon run to the river. Available resource-inventory data, selected juvenile production figures and estimated survival rates are used to estimate salmon production potential at various juvenile stages as well as to the adult stage. Results suggest that newly accessible portions of the river will produce approximately 34,000 fall fingerlings, yielding approximately 6,700 two-year smolts, with a projected annual contribution to all fisheries and to spawning escapement estimated at more than 1,300 adult salmon.

Advantages and disadvantages of several alternative methods of redeveloping an adult salmon run are compared. The selected alternative is a dispersal-type distribution of fall fingerlings, hatchery reared from eggs collected on the Big Salmon River. Activities are outlined to achieve full-scale run development by 1988. Areas requiring project assessment are suggested. The responsibilities of Parks Canada and of the Department of Fisheries and Oceans are identified.

Key words: Atlantic salmon enhancement, Point Wolfe River, Fundy National Park, fall-fingerling stocking, population modeling, migration obstruction.

RÉSUMÉ

Alexander, D.R. and P. Galbraith. 1982. A plan to reestablish a natural population of Atlantic salmon in the Pointe Wolfe River, Fundy National Park. Can. MS Rep. Fish. Aquat. Sci. No. 1667. v + 8 p.

Par suite de la décision de créer un passage à contre-courant pour le saumon au barrage de la rivière Point Wolfe, on a réexaminé les possibilités de rétablir une montaison de saumon de l'Atlantique dans la rivière. On s'est fondé sur les ressources/données d'inventaire disponibles, sur certains chiffres relatifs à la production de jeunes saumons et sur le taux estimatif de survie pour évaluer les possibilités de production de saumon à divers stades de croissance, ainsi qu'à l'âge adulte. Certains résultats suggère que dans certaines parties de la rivière devenues accessibles depuis peu, la production pourra atteindre environ 34 000 saumoneaux d'automne; on estime que de ce nombre, 6 700 smolts atteindront l'âge de deux ans et que plus de 1 300 saumons adultes viendront contribuer chaque année à la pêche et au frai.

On compare les avantages et les désavantages de plusieurs méthodes pour redévelopper une montaison de saumon adulte. La méthode choisie consiste en un procédé de dispersion de saumoneaux d'automne élevés en station piscicole à partir d'oeufs recueillis dans la rivière Big Salmon. Les travaux sont planifiés pour établir le plein potential de cette montaison an 1988. On suggère des domaines dans lesquels il faudra évaluer des projets. On précise les responsabilités que devront assumer Parcs Canada et le ministère des Pêches et des Océans.

Mots-clés: augmentation de la population de saumons de l'Atlantique, rivière Point Wolfe, Parc national de Fundy, repeuplement en saumoneaux d'automne, modelage de la population, interruption de la migration.

INTRODUCTION

The Point Wolfe River historically supported a self-sustaining population of anadromous Atlantic salmon (*Salmo salar*). The salmon run no longer exists in a natural form because migration to the otherwise available spawning and rearing habitat has been blocked by the existence of the Point Wolfe Dam situated at the river mouth. The dam, located within the boundaries of Fundy National Park, has been maintained under the Parks Canada policy to preserve the cultural heritage of the area. However, since an estimated 66% of the available freshwater salmon habitat in the river is also located within the park boundaries, the continued existence of the dam as a migration barrier conflicts with Parks Canada policy to preserve the natural heritage of the area. A compromise solution has been sought.

In 1981, the "Plan to restore the Point Wolfe River system to a condition that is analogous to that which existed prior to reconstruction of the Point Wolfe Dam" (Janes and Corbett 1981) was approved by the Director, Parks Canada, Atlantic Region. This approval authorized construction of a fish-passage channel through the dam and identified capital and operations funds to carry out the project in fiscal year 1984/85. Fish passage through the dam provides potential for the establishment of anadromous fish populations in the river.

Reestablishment of a natural population of Atlantic salmon in the Point Wolfe River is a major concern expressed in the 1982 Park Conservation Plan (Janes and Church 1982), second in priority only to the provision of fish passage at the dam. Given this priority, investigations which could lead to reestablishment of a representative population of Atlantic salmon in the Point Wolfe River, coincident with completion of the fish-passage channel in 1984/85, were undertaken. Results of these investigations and considerations are contained in this report.

HISTORICAL BACKGROUND

The Point Wolfe River reportedly abounded with Atlantic salmon prior to construction of a dam in 1824. Although the Point Wolfe Dam, built by lumberman John Ward, limited the migration of fish, records in Parks Canada files indicate that anadromous fish runs in the river remained substantial until at least 1849. In that year, a fish weir operated within the estuary below the dam caught nearly 500 salmon (Heinze 1975). Unfortunately for the salmon, 1849 is also the year in which another lumber baron, Moses Vernon, constructed a new mill and made additions to the dam. The modified dam was considered to be a total obstruction to upstream salmon passage, except that persistent ice damage between 1850 and 1886 did permit some salmon to escape upstream and to maintain a remnant population.

The present dam, located downstream from the original structure, was constructed for C.T. White in 1896 (Heinze 1975). This dam has been considerably altered throughout the years and extensive rebuilding took place in 1940. There is little information on the status of the salmon stocks in local rivers at that time. It is assumed that the dam was an effective barrier to upstream migrants, although some fish may have passed following flood and ice damage or during extreme high-tide conditions.

In 1950, after Fundy National Park had opened, an attempt was made to remove the dam. A hole was blasted in the crib-work as a first step in the operation but the job was not completed and the hole was quickly plugged by beavers. The dam was blown open by Parks Canada personnel in 1951 and remained passable to fish for approximately seven years before the policy priorities were reversed and the dam was again repaired. In 1965, investigations revealed that salmon were able to ascend the dam site when Parks Canada personnel opened hatchways in the structure (Dadswell 1968), but this difficult and repetitive procedure contributed to progressive structural damage. Extensive repairs were completed to the dam in 1967 and again in 1972. In each case, some fish passed the dam prior to repairs.

Stocking of the Point Wolfe River from federal hatcheries has been extensive. Most of the stocking was limited to brook trout (*Salvelinus fontinalis*), released into either Bennett Lake or Wolfe Lake, but rainbow trout (*Salmo gairdneri*) were stocked in 1962, 1963, 1964 and 1965. In addition, records show that 9,000 Atlantic salmon fingerlings were stocked in the river in 1968 and 11,885 smolts were released in the lower reaches in the spring of 1974.

Park wardens observe Atlantic salmon returning to the base of the Point Wolfe Dam each year, usually accompanied by numbers of other species. Although the original genetic strain may have had some impact on current stocks, it is probable that salmon returning now are an admixture of strays and descendents of strays from other rivers and from hatchery releases.

DESCRIPTION OF POINT WOLFE RIVER

The Point Wolfe River is one of the main watersheds in Fundy National Park (Fig. 1). The watershed consists of predominantly forested land rising to an elevation of 380 m. Total drainage area is 130.2 km^2 (Kerekes and Schwinghamer 1978) of which approximately 52% is within park boundaries. Bennett, Chambers, Caribou, Flagnar, Keyhole, Tracey and Wolfe lakes, inside the park, and Victor Lake, outside the park, are tributary to the Point Wolfe system. Total length of the mainstream and tributaries is 46.6 km (Hirvonen and Madill 1978) but, due to water levels in the tributaries and the occurrence of natural

physical barriers to upstream migration, only 23.3 km of the system is considered to be accessible to salmon for spawning and rearing. The lower 12-km stretch of river is acclaimed to be exceptional salmon habitat, "... approximately 95% of the area consists of ripples (riffles) and smooth flowing water over a gravel bed. The remainder of the section is occupied by large, deep, well-shaded pools." (Dadswell 1968). Thirty-three holding pools have also been identified within the park boundaries (Fig. 2). However, D. MacPhail[1], who walked portions of the river in 1970, feels that there is a lack of salmon holding areas, especially below Bennett Brook (pers. comm.). In some areas, stream banks consist of rock face to a height of 150 m above the stream bed, thus limiting access to a small minority of park visitors and hampering ground-survey measurements.

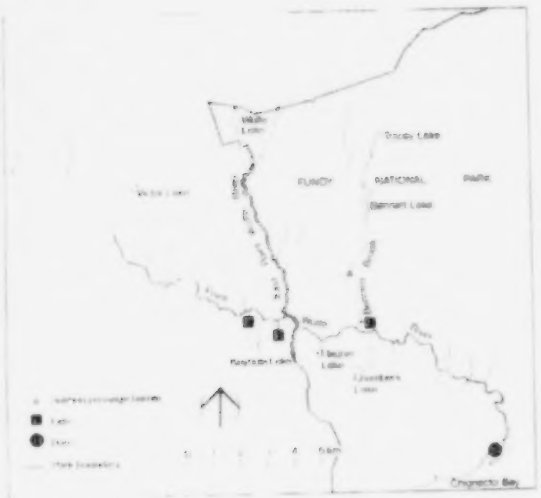

FIG. 1. Watershed - Point Wolfe River.

River discharge and water chemistry of the Point Wolfe River have been described by Kerekes and Schwinghamer (1978). Their data show that instantaneous flow rate measured above Point Wolfe Dam over the period 1964 to 1975 varied between a low of 22.9 m^3/min in July 1965 and a high of 1,514 m^3/min in May 1972. Mean instantaneous flow rate over the 11-year period was 312 m^3/min. This represents a mean total annual runoff of 1.63×10^8 m^3/year, or a mean water surplus of 1.25 m. The ice-free season mean value for pH was slightly acidic at 6.52. Water was clear, with a mean color value of four Hazen units; and specific conductance was determined to be 38.6 µmhos/cm, which is exceeded in the park only by the waters of McLaren Pond (Kerekes and Schwinghamer 1978). Total phosphorous was measured only twice with values of 3.0 and 3.6 mg/m^3.

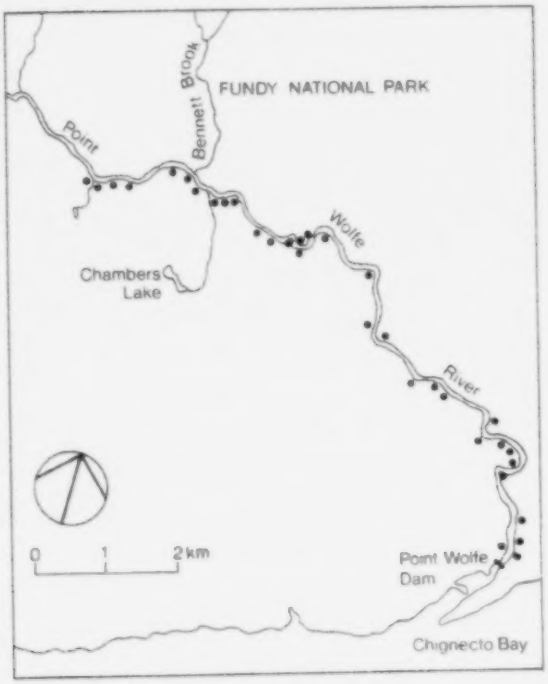

FIG. 2. Locations of salmon pools in part of Point Wolfe River, (from Wentzel 1974).

SALMON PRODUCTION POTENTIAL

There has been much speculation about the salmon production potential of the Point Wolfe River. Figures as high as 7,000 returning adults have appeared in some reports, without justification. Dadswell (1968) was more conservative when he compared the Point Wolfe to the Big Salmon River and implied that an adult run of 4,500 fish might be achieved. However informal estimates made by biologists in the Department of Fisheries and Oceans are in the order of 1,000 adult salmon per year (R. Gray[2] - pers. comm.). For this rehabilitation proposal a detailed estimate of the production potential is required.

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We have developed a simplistic model of salmon population dynamics on the Point Wolfe. The model yields estimates of the number of salmon surviving to adults, based on estimates of smolt production, and can be used to estimate stocking requirements, spawning requirements, sustainable yield and other parameters. Smolt production was derived as the product of 3.95 smolts/100 m^2, as determined for the highly similar Big Salmon River (Jessop 1975), and the estimated amount of available rearing area. Rearing area was determined from measurements of stream lengths taken from 1:50,000 scale maps, from estimates of stream widths derived somewhat subjectively from aerial photos, and from miscellaneous warden reports and personal knowledge of the river. Results of the calculations suggest that 6,740 smolts can be produced in the 170,675 m^2 of available salmon rearing habitat (Table 1). Of the total, 4,390 (65%) of the smolts would be produced in habitat located within the park. We have assumed an optimistic yet reasonable return as adults of 15% of the smolts. Adults can be expected to return as one-sea-winter virgins (grilse), two-sea-winter virgins and repeat spawners from each of these groups. The number of fish in each group has been estimated by including observed characteristics of the adult salmon run on the Upper Salmon River (Dadswell 1968) in the model as follows:

(1) 91% of survivors from smolts return as one-sea-winter virgins (1-SW).

(2) 9% of survivors from smolts return as two-sea-winter virgins (2-SW).

(3) 24% of one-sea-winter virgins return as first repeat spawners (1-SWR).

(4) 18% of first repeat spawning one-sea-winter virgins return as second repeat spawners (1-SWRR).

(5) 50% of two-sea-winter virgins return as first repeat spawners (2-SWR).

(6) 50% of first repeat spawning two-sea-winter virgins return as second repeat spawners (2-SWRR).

Results of the calculations (Table 2) show that the adult run to the Point Wolfe should reach 1,339 fish at full development in the fourth year of returning adults.

REHABILITATION OPTIONS

Many methods and numerous variations on those methods could be utilized in reestablishment of salmon on the Point Wolfe. The most noteworthy of the options include: (1) natural straying, (2) adult transfer, (3) smolt stocking, (4) finger-

TABLE 1. Estimates of juvenile rearing areas and Atlantic salmon smolt production potential in the Point Wolfe River.

Location	Length (m)	Width (m)	Rearing area (m^2)	Smolt production (number)
Main stem, from river mouth to confluence with East Point Wolfe River	12,500	8.5	106,250	4,197
Bennett Brook, from confluence with main stem to falls	1,000	4.9	4,900	194
Main stem, from confluence with East Point Wolfe River to headwaters	9,750	6.1	59,475	2,349
Total	23,250	-	170,625	6,740

TABLE 2. Estimated number of Atlantic salmon in each life-history category returning to the Point Wolfe River in each of four years during run development.

Year	Number of return fish						
	1-SW	2-SW	1-SWR	2-SWR	1-SWRR	2-SWRR	Total
1	920						920
2	920	91	221				1,232
3	920	91	221	45	40		1,317
4	920	91	221	45	40	22	1,339

ling stocking and (5) fry stocking. Advantages and disadvantages of each of the options have been examined in the following analysis to assist in selection of the most acceptable option.

NATURAL STRAYING

This option involves allowing adult salmon, probably strays, that currently frequent the Point Wolfe estuary to enter the river and spawn, thus resulting in rehabilitation of a run with minimal interference.

Advantages

(1) No cost for brood stock collection, juvenile rearing or juvenile distributions.

Disadvantages

(1) Process estimated to require 10-15 years after entry of first adults and with no exploitation in order to achieve full run development.

(2) It is possible that no strays will appear in a given year or that the number will be too small to mate successfully, thus delaying run development.

(3) Project delay, because the first adults would not enter until 1984, with smolts leaving in 1987 and the first grilse returning in 1988.

(4) Exploitation (angler harvest) should not be allowed for 10-15 years.

(5) If strays are too few, then the gene pool could be seriously limited with strong negative biological implications.

(6) Strays may be the least desirable stock for establishment in the Point Wolfe.

(7) Lack of genetic control; i.e., no opportunity for selection of desirable characteristics, such as early-run rather than late-run fish.

(8) Adults would require expensive protection from poaching, especially during the early years.

ADULT TRANSFER

This option involves the capture and transfer of sufficient aduits in the most desirable life-history category and in the appropriate sex ratio and state of maturity to produce optimum levels of recruitment from natural spawning. The theoretical requirement for spawning escapement to the Point Wolfe has been estimated at up to 150 mature fish. However, when allowances are made for fall-back, handling mortalities, poaching, predation, other forms of natural mortality, sex imbalance and redd superimposition, the actual transfer requirement could be as high as 300-400 fish. Transfers of this magnitude would be required for four years, with a smaller number of large two-sea-winter fish in the fifth year.

Advantages

(1) Good natural selection of progeny in the stream.

(2) Good potential for selection of desirable stock characteristics.

(3) Large gene pool.

Disadvantages

(1) Adverse public relations - Fisheries and Oceans personnel anticipate a considerable public opposition to such a large-scale adult transfer.

(2) Few available sources of such a large number of fish.

(3) High cost of collecting and transferring fish, plus there may be a need to hold large numbers of early-run fish in hatchery ponds.

(4) High cost of protecting adults from poachers.

(5) Great risk of high loss of adults from unexpected environmental or biological factors.

SMOLT STOCKING

This option involves rearing juvenile salmon in the hatchery environment until they reach the smolt stage, which would be two years of age in this case. Smolts would be released to freshwater near the estuary in the spring of four consecutive years. The number of fish stocked would probably be held to the natural production level of 6,739 because of the limited hatchery space available, even though return of adults to the river from hatchery fish would be fewer than from wild smolts and probably would not exceed 5%.

Advantages

(1) The number of ova required would be modest, at approximately 14,000.

(2) The potential for selection of desirable stock characteristics remains good.

(3) Number of smolts reaching the sea is known.

(4) Potential for assessment is good since fish can be marked at the hatchery.

(5) Low effort and cost to distribute fish.

Disadvantages

(1) High cost of production in hatchery environment.

(2) Reduced natural selection in streams probably contributes to higher mortality at sea.

(3) Commitment of hatchery space is not acceptable to Fisheries and Oceans at this time.

(4) Number of returning adults is below the projected river potential, unless smolt production is increased to compensate.

(5) Reduced gene pool is probable because of small brood stock requirement.

(6) Poor imprinting of smolts results in greater straying than for smolts produced in the river.

(7) Lengthy hatchery rearing time increases risk of disease transfer.

FINGERLING STOCKING

This option involves collecting brood stock to produce eggs which would be reared in the hatchery to the fingerling stage. Fingerlings would be dispersed throughout the Point Wolfe River, where they would rear naturally to the smolt stage at two years of age. Based on an estimated survival of 20% from fall fingerlings to smolts, 33,700 fingerlings per year for each of four years are required to produce the desired level of smolt production.

Advantages

(1) Moderate costs for broodstock collection and rearing, with hatchery space requirements acceptable to Fisheries and Oceans.

(2) Timing of first returning adults would coincide with current plans for construction of fish-passage facilities in the Point Wolfe Dam.

(3) Good natural selection of progeny in stream.

(4) Good potential for selection of desirable stock characteristics.

(5) Reasonable gene pool size.

(6) Required number of ova not excessive, at 50,000 per year.

(7) Adequate stocks on hand from the 1981 brood year to commence stocking in 1982.

Disadvantages

(1) Requires dispersal type of stocking with associated increases in cost.

(2) Requires some monitoring to determine survival rate in streams and level of smolt production.

FRY STOCKING

This option involves the collection of an appropriate brood stock for egg production; hatching of eggs in conventional hatcheries or streamside incubators and distribution of the juveniles at the fry stage. It is estimated that the stocking requirement is for 168,500 fry.

Advantages

(1) Hatchery costs are low.

(2) Good natural selection of progeny in streams.

(3) Good potential for selection of desirable stock characteristics.

(4) Good gene pool size.

Disadvantages

(1) Requires intensive dispersal type of stocking, which is difficult in the Point Wolfe River.

(2) Requires extensive instream monitoring to determine mortality rates and smolt production.

(3) Ova requirement is increased to excessive levels, approaching 200,000.

(4) Brood stock not available before fall 1982, and possibly not then because of number required.

(5) Increased risk of higher than expected mortalities resulting in project failure.

SELECTED ALTERNATIVE

Consideration of economic, biological and social factors leads to the selection of fingerling stocking as the most acceptable option to achieve the stated objective. Current estimates of operational costs, person-power and hatchery space requirements fall within the capabilities of Parks Canada and Fisheries and Oceans to provide.

STOCK SELECTION

It was noted in the background to this report that salmon currently migrating to the base of the Point Wolfe

Dam are probably a mixture of various stocks. Strays from hatchery distributions occur among these fish and may include stocks from the Miramichi or Restigouche, which are atypical of the Bay of Fundy. Currier (1982) concluded that it would be impossible at this point to rehabilitate the Point Wolfe with a salmon stock identical to that which originally existed there. Nevertheless, in order to conform to Parks Canada policy and to improve the potential for successful redevelopment of the run, it is essential that the Point Wolfe River be rehabilitated by using salmon from the Bay of Fundy Region that are similar to the indigenous stock. Established stocks in adjacent rivers such as the Upper Salmon (Alma) River or the Big Salmon River are potential donor candidates. Of the two, the number of fish surplus to the minimum spawning requirements is considered to be greater in the Big Salmon River. Experience has also proven the feasibility of collecting broodstock from the Big Salmon River, whereas the Alma River may be more difficult to collect from. Consequently, it is recommended that Big Salmon River stocks be used in the rehabilitation program.

STOCKING ACTIVITIES AND RESULTS - POINT WOLFE RIVER

Activities under the Point Wolfe River salmon rehabilitation proposal are outlined below for each project year/calendar year of an eight-year project.

1/1981 - Collect brood stock from Big Salmon River, spawn fish at Saint John Hatchery, return kelts to river, incubate eggs. (NOTE: Suitable salmon fry are now on hand for stocking in 1982, but fish can be diverted to other projects if necessary.)

2/1982 - Continue rearing fish at Saint John Hatchery to the fall fingerling stage. Transport fingerlings to Fundy National Park and disperse these throughout the Point Wolfe. Collect brood stock from Big Salmon River, spawn fish, return kelts to river, incubate eggs. Refine river inventory data through contracted field projects.

3/1983 - Continue rearing fish at hatchery to the fall fingerling stage. Transport fingerlings to Fundy National Park and disperse these throughout the Point Wolfe River. This distribution activity will likely be modified somewhat in 1983, based on experience gained in 1982. Instream monitoring of growth and survival of previously stocked fingerlings from the 1982 year-class (now yearlings) should commence during the summer by using electroseining techniques. Collect brood stock from Big Salmon River for a third year, spawn fish, return kelts, incubate eggs.

4/1984 - Continue rearing of fish to fall fingerlings. Transport and distribute fingerlings. If fish from the 1982 year-class emigrate as two-year smolts as anticipated, then they will migrate to sea in the spring of 1984. Some smolt assessment should be contemplated. Monitor growth and survival of yearlings in the 1983 year-class by electroseining. Fish from the 1982 year-class, recovered during instream electroseining in the summer of 1984, will give an indication of the three-year smolt component in the population. Collect brood stock from Big Salmon River for the fourth and final year, spawn fish, return kelts to river, incubate eggs.

5/1985 - Continue rearing fish to fall fingerlings. Transport and distribute fingerlings. Monitor smolt emigration if feasible. Monitor growth and survival of yearlings in the 1984 year-class by electroseining. The first return of grilse from the 1982 year-class (1981 brood year, 1984 smolts) is expected in 1985. Provision should be made to enumerate these fish and to monitor spawning success.

6/1986 - No rearing, stocking or brood stock collection is required if survival has been as predicted and if no unexpected problems have developed. If the smolt run has been monitored in previous years, this should continue for the 1984 year-class. Similarly, instream monitoring should continue to examine growth and survival of fish stocked as fingerlings in the 1985 year-class as well as for emergence of fry in the 1986 year-class from the 1985 instream spawning of grilse. Provision should be made to enumerate returning adults, which should include: 1-SW virgins, 1-SW repeat spawners and 2-SW virgins. An effort should be made to monitor spawning success.

7/1987 - Instream monitoring of juveniles should be continued. Smolt enumeration could be either maintained or dropped, depending on success to date. Enumeration of returning adults should be continued.

8/1988 - In theory, the adult run of salmon to the Point Wolfe will reach its full potential in 1988. Appropriate monitoring of juveniles and adults should continue.

SUMMARY OF SPECIAL PROJECT REQUIREMENTS

The Big Salmon River has been selected to provide appropriate stock for use in this program. Emphasis should be placed on the collection of early-run salmon. No major problems are anticipated in the collection of fish to produce the minimum requirement of 50,000 ova. A brood stock collection was successfully completed by Fisheries and Oceans personnel in 1981. Nevertheless, additional person-power provided by Parks Canada would be an asset for future collections, particularly if the individuals are equipped to either scuba dive or snorkel in cold-water conditions. Fish transportation

units provided by Fisheries and Oceans are ideal for this project but some improvement could be made in the type of seine net used in 1981.

Salmon collected for brood stock in 1981 were spawned at Saint John Hatchery and the rearing program for the station has been modified to allow continued rearing of the fish to the fall fingerling stage. Rearing space will be provided at Saint John or at an alternate site, if necessary, for the planned duration of the Point Wolfe stocking program.

A dispersal-type of distribution is required for the release of fingerlings into the Point Wolfe River. Although some sites on the river can be reached by ground access, most of the 33,700 fingerlings must be transported from the distribution truck to streamside locations by helicopter. Appropriate access points have been identified. Dispersal of the fingerlings from these access points will be labour intensive yet brief. The operation will require careful coordination and additional advance work is required to confirm the suitability of selected access points. Technical discussions must be held on the type of transportation unit and loading densities used in the helicopter as well as at streamside.

Instream monitoring of the program is scheduled to begin in 1983. At the present time it is anticipated that this monitoring will be limited to standard electroseining of between three and six sites on the river. Monitoring of the smolt run would not begin until 1984 and, depending on the 1983 electroseining results, it might be decided to forego this monitoring. Operation of a smolt fence on the Point Wolfe would be expensive and labour intensive and is not likely justified. Simpler devices, such as a floating Wolf Trap, would yield some information on the smolt run and could be produced at low cost. Part of the overall assessment could include adipose fin-clipping of fingerlings prior to release from the hatchery. At a later date this would permit distinction between hatchery-return fish and possible strays. The use of micro-nose-tags might also be considered by the Department of Fisheries and Oceans. Monitoring of adult returns is scheduled to begin in 1985 and could be limited to a simple count of fish in pools by a particular date.

It is anticipated that National Parks Fishing Regulations will be amended to close the Point Wolfe River to all angling from May 19, 1984, to October 15, 1986. During 1986, a decision will be made concerning the form of future fishing regulations for the river.

RESPONSIBILITIES - PARKS CANADA

(1) a. Complete construction designs for Point Wolfe fish-passage channel by March 31, 1983.

	1982-83
Capital costs ($000)	6.5

b. Complete Point Wolfe fish-passage channel by September 1984.

	1983-84
Capital costs ($000)(approval via Program Forecast)	35.5

(2) Provide transportation and personpower for dispersal of fall fingerlings to Point Wolfe River system; all costs covered by Parks Canada.

	1982-83	1983-84	1984-85	1985-86
Personpower (person days)	5	5	5	5
O&M costs, including helicopter rental ($000)	3.0	3.0	3.0	3.0

(3) Provide assistance to Fisheries and Oceans for brood stock collection in Big Salmon River.

	1982-83	1983-84	1984-85
Personpower (person days)	6	6	6

(4) In cooperation with Fisheries and Oceans, monitor success of fall fingerling stocking.

	1983-84	1984-85	1985-86	1986-87	1987-88
Personpower (person days)	12	12	12	12	12

(5) Recommend changes in the National Parks Fishing Regulations and the Federal Fisheries Act to protect adult stocks between May, 1984, and October, 1986.

(6) Coordinate public information involving rehabilitation project.

(7) In cooperation with Fisheries and Oceans, monitor the number of returning adults.

	1985-86	1986-87	1987-88
Personpower (person days)	4	4	4

RESPONSIBILITIES - FISHERIES AND OCEANS

(1) Review construction design for Point Wolfe Dam fish-passage channel; approval by July 1, 1983.

(2) Collect brood stock from Big Salmon River for four years, commencing fall, 1982, with assistance from Parks Canada personnel, in order to produce the desired number of eggs for this project; costs will be covered by Department of Fisheries and Oceans except for assistance from Parks Canada personnel.

(3) Hatch, rear and deliver to Fundy National Park approximately 33,700 fall fingerlings for four years commencing 1982-83; costs will be covered by Department of Fisheries and Oceans.

(4) In cooperation with Parks Canada, monitor success of fall fingerling stocking.

	1983-84	1984-85	1985-86	1986-87	1987-88
Personpower (person days)	10	10	10	10	10

(5) Provide specialized scientific equipment required for project assessment.

(6) In cooperation with Parks Canada, monitor the number of returning adults.

	1985-86	1986-87	1987-88
Personpower (person days)	4	4	4

OVERALL PROJECT EVALUATION

Parks Canada and the Department of Fisheries and Oceans will complete an overall project evaluation prior to November 30, 1985. At that time, details for establishment of a sport fishery will be discussed. Consideration will also be given to the continuation of project monitoring and evaluation into the years 1986 through 1988, as suggested.

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